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Practitioner's Docket No. P1721US01 (65695/05-356)

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Smith, Toby

Application No.: 10/619,700

Group No.: 2646

Filed: 07/14/2003

Examiner: Huyen D. Le

For: Dual Side Mount Shock Resistant Piezoelectric Bender

MAIL STOP APPEAL BRIEFS – PATENTS

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF  
(PATENT APPLICATION--37 C.F.R. § 41.37)

1. Transmitted herewith is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on March 24, 2006 and granted on April 5, 2006.

2. STATUS OF APPLICANT

This application is on behalf of a small entity.

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10\*

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Date:

5-31-06

Carol Welch

(type or print name of person certifying)

\* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness. See § 1.703(f). Consider "Express Mail Post Office to Addressee" (§ 1.10) or facsimile transmission (§ 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

3. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 C.F.R. § 41.20(b)(2), the fee for filing the Appeal Brief is:

small entity \$250.00

**Appeal Brief fee due \$250.00**

4. EXTENSION OF TERM

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136 apply.

Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal brief fee \$250.00  
Extension fee (if any) \$ 0.00

**TOTAL FEE DUE \$250.00**

6. FEE PAYMENT

Authorization is hereby made to charge the amount of \$250.00 to Credit card as shown on the attached credit card information authorization form PTO-2038.

7. FEE DEFICIENCY

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Toby SMITH

Application No.: 10/619,700

Filed: 07/14/2003

Title: Dual Side Mount Shock Resistant Piezoelectric

Bender

Art Unit: 2646

Examiner: Huyen D. Le

Attorney Docket No.: P1721US01 (65925/05-356)

**APPELLANT'S BRIEF UNDER 37 C.F.R. §41.37**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Pursuant to the requirements of 37 CFR § 41.37, this brief is submitted, along with the accompanying fee set forth in § 41.20(b)(2), within two (2) months of the date of the Decision to Grant Appellant's Request to Revive the above-referenced patent application. The date of the Decision was April 5, 2006, therefore, the two month date for the filing of Appellant's Appeal Brief is June 5, 2006. This brief is intended to fully comply with all of the requirements set forth in CFR § 41.37.

**I. REAL PARTY OF INTEREST**

The real party of interest in the instant patent application is the assignee of all right, title, and interest in, to and under the patent application, to wit:

Bed-Check Corporation  
307 E. Brady  
Tulsa, OK 74120

06/06/2006 WASFAW1 00000054 10619700

01 FC:2402

250.00 OP

The assignment of the instant application to Bed-Check Corporation was recorded in the United States Patent and Trademark Office at Reel 014343, Frame 0870 on July 14, 2003.

## **II. RELATED APPEALS AND INTERFERENCES**

There are no prior or pending appeals, interferences, or judicial proceedings known to Appellant, Appellant's legal representative, or the assignee which may be related to, directly affect, or be directly affected by or have a bearing on the Board's decision in this appeal.

## **III. STATUS OF CLAIMS**

This application was filed on July 14, 2003 and claims the benefit of U.S. Provisional patent application Serial No. 60/477,668, filed June 11, 2003. The application as-filed contained Claims 1-22. Claims 8, 17, and 21 were canceled by applicant in a response filed February 1, 2005. Amendments were offered and accepted with respect to Claims 5 and 14 in this same filing. The amendment to Claims 5 and 14 changed the words "piezoelectric device" to "piezoelectric material" in these two claims. There have been no other claim amendments.

Additionally, applicant hereby cancels Claims 19, 20, and 22 without prejudice for purposes of the instant appeal.

Consequently, the only claims that remain for purposes of the instant appeal are 1-7, 9-16, and 18.

## **IV. STATUS OF AMENDMENTS**

No claim amendments have been requested subsequent to the final rejection.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

The independent claims involved in this appeal are Claims 1 and 10. Both of these claims are generally directed toward an improved acoustic generating device 111 (Specification p. 5, lines 7, 8, and 15 and FIG. 5) which comprises piezoelectric material 104 (Specification p. 4, line 8, p. 6, lines 17, 19, and 20 and FIG. 3), a metal diaphragm or bender 102 (Specification, p. 3, lines 22, 23; p. 4, lines 7, 9, 11, 13, 18; p. 6, lines 16, 18 and FIG. 2), an electric circuit 110 (Specification, p. 4, lines 20, 23; p. 5, line 9 and FIG. 4) and mounting devices 114 and 116 (Specification, p. 5, line 9 through p. 6, line 2; p. 6, lines 8-15 and FIG. 5).

The piezoelectric material 104 (Specification p. 4, line 8, p. 6, lines 17, 19, and 20 and FIG. 3) is bonded to the metal diaphragm 102 (Specification, p. 3, lines 22, 23; p. 4, lines 7, 9, 11, 13, 18; p. 6, lines 16, 18 and FIG. 2) as is typically done. However, and as is unlike any known prior art, the piezoelectric material 104 (Specification p. 4, line 8, p. 6, lines 17, 19, and 20 and FIG. 3) / diaphragm combination 102 (Specification, p. 3, lines 22, 23; p. 4, lines 7, 9, 11, 13, 18; p. 6, lines 16, 18 and FIG. 2) is *mounted from both sides along a nodal fulcrum F* (element F in FIGS. 2 and 5, Specification, p. 4, line 13) *using adhesives* (Specification p. 5, line 13 through p. 6., line 2), wherein the nodal fulcrum F is a circular band that remains relatively immobile when the piezoelectric material is electrically energized (Specification p. 4, lines 12-13, p. 6, lines 3-7). For purposes of specificity hereinafter, the phrase “piezoelectric element” will be used to refer to the piezoelectric material 104 and diaphragm 102 combination.

The electric circuit **110** (Specification, p. 4, lines 20, 23; p. 5, line 9 and FIG. 4) is connected to the piezoelectric material **104** (Specification p. 4, line 8, p. 6, lines 17, 19, and 20 and FIG. 3) and conducts electrical current thereto, thereby causing the piezoelectric material **104** (Specification p. 4, line 8, p. 6, lines 17, 19, and 20 and FIG. 3) to expand and contract. The mounting devices **114** and **116** (Specification, p. 5, line 9 through p. 6, line 2; p. 6, lines 8-15 and FIG. 5) are constructed of insulating material and are positioned at the top and bottom of the metal diaphragm **102** (Specification, p. 3, lines 22, 23; p. 4, lines 7, 9, 11, 13, 18; p. 6, lines 16, 18 and FIG. 2) and support it along a nodal fulcrum **F** (FIGS. 2 and 5 element **F**, Specification p. 5, line 12 through p. 6., line 2, Specification p. 6, lines 3-7). As was indicated previously, the mounting devices **114** and **116** (Specification, p. 5, line 9 through p. 6, line 2; p. 6, lines 8-15 and FIG. 5) that support the metal diaphragm **102** (Specification, p. 3, lines 22, 23; p. 4, lines 7, 9, 11, 13, 18; p. 6, lines 16, 18 and FIG. 2) are connected to it both top and bottom with an adhesive (Specification p. 6, lines 8-15).

Both of applicant's remaining independent claims **1** and **10** contain the following identical claim language which is crucial to applicant's claim of patentability:

**Claims 1 & 10.** An acoustic generating device, comprising:

... mounting devices constructed of insulating material and positioned at the top and bottom of the metal diaphragm wherein the mounting devices support the metal diaphragm at the nodal fulcrum with an adhesive.

That is, the instant invention is directed toward the use of upper and lower mounting devices **114** and **116** (Specification, p. 5, line 9 through p. 6, line 2; p. 6, lines 8-15 and FIG. 5) that are

positioned at the top and bottom of the metal diaphragm **102** (Specification, p. 3, lines 22, 23; p. 4, lines 7, 9, 11, 13, 18; p. 6, lines 16, 18 and FIG. 2) and that support the diaphragm at a nodal fulcrum **F** (FIGS. 2 and 5 element **F**, Specification p. 5, line 12 through p. 6., line 2, Specification p. 6, lines 3-7) with an adhesive (Specification p. 6, lines 8-15).

Additionally, Claim **10** recites, in accordance with a preferred aspect of the instant invention, a housing **112** (Specification p. 5, lines 8, 10, 11, 16, 22; p. 6, line 1 and FIG. 5) into which the plastic (Specification, page 5, lines 17-18) upper and lower mounting devices **114** and **116** (Specification, p. 5, line 9 through p. 6, line 2; p. 6, lines 8-15 and FIG. 5) will preferably be molded or affixed by adhesives (Specification, page 5, lines 14-17).

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Pursuant to the Examiner's Final Office Action mailed July 26, 2005 (the "Final Office Action"), the following is the sole ground for rejection presented for review in this appeal.

1. Claims **1-7, 9-16, 18-20**, and **22** stand as rejected under 35 USC 103(a) as being unpatentable over Byrne (USPN 4,330,729) in view of Nakagawa (USPN 4,430,529).  
(Page 2 of the Final Office Action).

Please note that Claims **19, 20**, and **22** have been withdrawn for purposes of the instant appeal and thus the rejection quoted above is moot with respect to those claims. Thus, only Claims **1-7, 9-16, 18**, remain currently at issue.

## VII. ARGUMENT

All claims currently stand as rejected as being unpatentable over Byrne in view of Nakagawa. It is said that Byrne teaches mounting devices that are constructed of insulating material and positioned at the top and bottom of the metal diaphragm. It is further said that Byrne does not specifically teach mounting with adhesive, but that it is very well known in the art to provide an adhesive for fixing or connecting the mounting devices to the diaphragm. It is further said on page 3 of the Final Office Action that Nakagawa has been provided for the teaching of using an adhesive for securing the diaphragm to a support surface of a piezoelectric loudspeaker and not for modifying the structure of the Byrne loudspeaker.

By way of general introduction, it should be noted that piezoelectric devices of the general sort disclosed and claimed in applicant's patent application have been in use for over 50 years. (See, for example, Hansell, USPN 2,761,076, issued Aug. 28, 1956, which is of record in this case but not relied upon for the instant rejection). However, to the best of applicant's knowledge *no one* in that time period has ever mounted a piezoelectric bender along a nodal ring using adhesives on both sides. Further, the Examiner has failed to provide *any* example of this particular arrangement. Further, it is believed that the instance rejection under 35 USC 103(a) is improper in view of the cited references.

- 1. The cited references do not contain a *single* example of a piezoelectric device that is mounted on a nodal ring by using an adhesive on *both* sides of the device.**

More particularly, applicant has searched the references that have been selected by the Examiner and cannot find a single example wherein glue is used on *both* sides of a

piezoelectric element to mount it and, more particularly, to mount it via adhesives that have been placed along a nodal ring. It is, of course, old and well known to use a mounting adhesive on *one* side of a bender. However, applicant's invention comprises a diaphragm that is supported on *both* sides through the use of an adhesive, thereby obtaining increased shock and shear resistance (as is stated in the application), and the Examiner has failed to cite a single instance in the prior art where another has done that.

For example, the Examiner offers **Nakagawa** at col. 3, lines 29-31 and col. 4, lines 42-44 as support for the use of adhesive for connecting the mounting device to the diaphragm. However, both of the cited passages refer to piezoelectric devices that use adhesives on a *single* side. The Nakagawa specification at col. 3, lines 29-31 is concerned with the embodiment of Figure 5, which shows support (and adhesive) for the piezoelectric diaphragm on a single side. Similarly, the text at col. 4, lines 42-44 refers to the use of adhesive on a *single* side (emphasis added):

In a fifth embodiment in FIG. 8, the piezoelectric diaphragm 12 is kept stuck by adhesive or pressurized by protuberance 14a at its central portion only from one side, which corresponds to the embodiment in FIG. 6 from which the frame 13 and elastic body 21 are omitted, where the diaphragm 11 is fixed to the edge of frame 14.

Adhesives are used in this single-sided embodiment (i.e., only a single central protuberance is used) to hold the diaphragm immobile at a point not on the nodal ring with adhesive applied on only one side.

Of course, Nakagawa's Figure 6 embodiment – which has tapered support protuberances 13a and 14a on both sides of the piezoelectric element – does not utilize adhesive to attach those protuberances to either side of the bender. Further, although the specification does discuss the use of adhesive to affix the elastic bodies 21 and 22 to the upper and lower

surfaces of the diaphragm (e.g., col. 3, lines 59-66), there is no mention of further affixing them to the protuberances. Indeed, the application makes it clear that in this embodiment the adhesive is optional and an variation is presented in which the elastic bodies 21 and 22 are held in place by tension alone (col. 4, lines 24-28), i.e., without any sort of adhesive.

Finally, it is critical to note that Nakagawa does not use adhesive at the center of the piezoelectric device so much for *support* but rather to keep the center of the diaphragm relatively stationary, thereby altering its acoustic properties. See, for example, the discussion in connection with Figure 5 wherein the inventor explains: “The central portion of diaphragm 11 is fixed substantially at a point to the tip of support 17 by the adhesive, thereby being kept stationary.” Col. 3, lines 29-31. The actual mounting support for this device occurs at its perimeter – not at a nodal ring – where the specification indicates that adhesive may optionally be used to affix the bender to its mounting frame. Thus, Nakagawa is an example where adhesives are applied to both sides of a bender, *not* for purposes of mounting support, but rather for purposes of modifying the sound emitted thereby. Further, adhesives are applied at an *anti-node* of the bender, i.e., the locus of *maximum* (not minimum) deflection of the bender, in contrast to applicant’s mounting of the piezoelectric device along a *nodal* (non-moving) ring.

Turning next to the **Byrne** reference, the applicant reiterates that there is no teaching or suggestion in Byrne that a piezoelectric device might be mounted on a nodal ring by using adhesive on both sides. Byrne (col. 1, lines 35-37) suggests what is already well known in the art: a diaphragm may be attached to a support member at its nodal ring by using rubber-like cement. Byrne mentions – and discourages the use of – adhesives in this passage and never again thereafter. Consider, for example, Byrne’s aversion to gluing (“In many instances, the diaphragm is attached to the support member by a rubber-like cement which requires a period of time for

curing”) at column 1, lines 35-37, emphasis added. Of course, the time required to apply and cure an adhesive would be antithetical to Byrne’s stated goal of providing “an improved piezoelectric transducer assembly that can be rapidly and easily assembled . . .”, column 2, lines 2-3, emphasis added.

Thus, there is no teaching or suggestion in the prior art that a piezoelectric device might be mounted on a nodal ring by using an adhesive on *both* sides of the device, as has been suggested by the applicant.

**2. The Examiner has combined a reference that teaches the use of adhesive on a single side of a piezoelectric device at a non-nodal location (Nakagawa) with a reference that teaches clamping the piezoelectric device on a nodal ring (Byrne) to reject applicant’s invention.**

Nakagawa “mounts” (actually, the term “restrains” would be more appropriate) a piezoelectric device at its center, thereby changing the resonance properties of the device. The center of the piezoelectric device is *not* a nodal point as that term is used herein (compare Nakagawa Figures 2 and 4). As is discussed *supra*, there is no teaching or suggestion in Nakagawa that adhesive could be applied to both sides of such a device.

Byrne discourages the use of adhesives (see, e.g., col. 1, lines 35-38). Further, Byrne’s mounting of the diaphragm along a nodal curve via mechanical means can only result in an alteration of the sonic properties of the device (e.g., the diaphragm is clamped in place, thereby inevitably stressing it and broadening the effective dimensions of the nodal ring beyond its actual dimensions).

Although Byrne mentions gluing a diaphragm along a nodal ring (col. 1, lines 29-37), that reference never once indicates that such glue might be placed on *both* sides of the diaphragm, as is done with applicant's invention. In fact, gluing is listed as a problem for which Byrne's disclosed invention is offered as a solution.

Finally, in the Final Office Action at Paragraph 3, the Examiner indicates that he has not combined the Nakagawa reference with the Byrne reference to modify its structure, but rather Nakagawa has merely been cited to provide an example of the use of "an adhesive for securing the diaphragm to a support surface of a piezoelectric loudspeaker." Final Office Action at Page 3.

In reply, applicant finds this comment somewhat puzzling in view of the fact that Byrne itself includes a reference to the use of adhesive to affix a diaphragm to a support surface (albeit on a single side). Thus, applicant would argue that the Nakagawa reference provides nothing beyond Byrne and, of course, neither reference – either individually or in combination – teaches the applicant's particular invention. Finally, it should be noted that the combination of Byrne and Nakagawa, which the Examiner claims was not utilized in the rejection, results in a piezoelectric device that is inoperable, i.e., one where both the node and anti-node are immobilized by clamping and gluing.

### **3. The prior art teaches away from applicant's invention.**

As was discussed previously, Byrne discourages the use of adhesives (see, e.g., col. 1, lines 35-38). The U.S. Supreme Court, in commenting on rejections under Section 103, said in *United States v. Adams*, 383 U.S. 39, 52 (1966):

We do say, however, that known disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account in determining obviousness.

With respect to the instant application, the known (to Byrne) disadvantage of gluing a piezoelectric device along a nodal ring should have been taken into account in any obviousness determination. Applicant believes that this aspect of Byrne was not properly considered and, if it had been, the instant claims would have been allowed.

**4. There is no teaching or suggestion in the prior art that a piezoelectric device might be mounted by using glue on both sides along a nodal ring.**

There is no mention in any case relied upon that a piezoelectric device might be mounted on both sides along a nodal ring using adhesive. In every case cited by the Examiner, the reference merely mentions or utilizes the well-known practice of mounting a piezoelectric device by placing an adhesive on only one side or, alternatively in those instances where the diaphragm is mounted from *both* sides, a physical mounting method (e.g., clamping, etc.) is used.

Thus, the Examiner has failed to provide any motivation or suggestion *in the prior art* for the modification to Byrne (and/or Nakagawa) that is relied upon by the Examiner and that is said to yield the instant invention.

**5. The instant rejection under Section 103(a) is improper and should be withdrawn.**

In view of the foregoing it is believed that the instant rejection should be withdrawn and this case passed to issue. Recall the words of the Federal Circuit:

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.

*In re Fritch*, 23 USPQ 2d 1780, 1783-84 (Fed. Cir. 1992).

*Accord, Hartness International, Inc. v. Simplimatic Engineering Co.*, 2 USPQ2d 1826, 1832 (Fed. Cir. 1987). In determining obviousness, "the inquiry is not whether each element existed in the prior art, but rather whether the prior art made obvious the invention as a whole for which patentability is claimed." Here, applicant firmly believes that the Examiner has failed to demonstrate that the invention *as a whole* has been made obvious by any of the cited references, either individually or in combination.

Finally, the applicant believes that the Examiner has improperly engaged in hindsight reconstruction of the applicant's invention and, for that reason, the instant rejection should be withdrawn. Recall, that no reference of record in this case discloses the use of adhesive on both sides of a piezoelectric diaphragm, wherein the adhesive is applied along a nodal ring. That fact pattern brings to mind the words of the Federal Circuit in *W.L. Gore & Associates, Inc. v.*

*Garlock, Inc.*, 220 USPQ 303, 312-13 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984):

To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.


Applicant believes that, in rejecting the instant claims based on the references that are of record, the Examiner has failed to heed the words of the Federal Circuit in this regard.

### VIII. CONCLUSION

Applicant has met all of the requirements of patentability and it is therefore respectfully requested that the rejection of Applicant's Claims 1-7, 9-16, and 18 be withdrawn and that these claims be allowed to issue.

Respectfully Submitted,

5/31/06  
Date

  
\_\_\_\_\_  
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## CLAIMS APPENDIX

1. An acoustic generating device, comprising:
  - a piezoelectric material;
  - a metal diaphragm bonded to the piezoelectric material and having a nodal fulcrum;
  - an electric circuit connected to the piezoelectric material that electrically activates the piezoelectric material; and
  - mounting devices constructed of insulating material and positioned at the top and bottom of the metal diaphragm wherein the mounting devices support the metal diaphragm at the nodal fulcrum with an adhesive.
2. The acoustic generating device of claim 1, wherein the metal diaphragm is substantially round.
3. The acoustic generating device of claim 1, wherein the mounting devices are attached to the inside of a housing that at least partially encloses the acoustic generating device.
4. The acoustic generating device of claim 1, wherein the electric circuit is at least partially mounted on a circuit board that is located proximate one of the mounting devices.
5. The acoustic generating device of claim 1, wherein one of the mounting devices is attached to the piezoelectric material with the adhesive.

6. The acoustic generating device of claim 1, wherein at least one of the mounting devices is attached to the metal diaphragm with the adhesive.
7. The acoustic generating device of claim 1, wherein at least one of the mounting devices is substantially round.
8. Cancelled
9. The acoustic generating device of claim 1, wherein the piezoelectric material is ceramic.
10. An acoustic generating device, comprising:
  - a piezoelectric material;
  - a metal diaphragm affixed to the piezoelectric material and having a nodal fulcrum;
  - a housing that substantially encloses at least the piezoelectric material and the metal diaphragm;
  - an electric circuit connected to the piezoelectric material that electrically activates the piezoelectric material; and
  - mounting devices constructed of insulating material and positioned at the top and bottom of the metal diaphragm wherein the mounting devices support the metal diaphragm at the nodal fulcrum with an adhesive.
11. The acoustic generating device of claim 10, wherein the metal diaphragm is substantially a disk.

12. The acoustic generating device of claim 10, wherein the mounting devices are attached to the inside of the housing.
13. The acoustic generating device of claim 10, wherein the electric circuit is at least partially mounted on a circuit board that is located proximate one of the mounting devices.
14. The acoustic generating device of claim 10, wherein one of the mounting devices is attached to the piezoelectric material with the adhesive.
15. The acoustic generating device of claim 10, wherein at least one of the mounting devices is attached to the metal diaphragm with the adhesive.
16. The acoustic generating device of claim 10, wherein at least one of the mounting devices is substantially round.
17. *(Cancelled)*
18. An acoustic generating device of claim 10, wherein the piezoelectric material is ceramic.
19. *(Cancelled)*
20. *(Cancelled)*

21. (*Cancelled*)

22. (*Cancelled*)

## EVIDENCE APPENDIX

	<u>Document No.</u>	<u>Date</u>	<u>Name/Title</u>	<u>Record Citations</u>
1.	US 4,330,529	02/07/1984	Nakagawa, et al.	Final Office Action, Pages 2-3
2.	US 4,330,729	05/18/1982	Byrne	Final Office Action, Pages 2-3

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